"4. That the sounds detected in the uterine region, unless double, cannot have been cardiac, nor unless double the arterial pulse of the fœtus, can they have been connected with its heart, consequently that such an amount as from 140 to 160 single sounds cannot be referred to the fœtal heart.

"5. That one of the authorities for fœtal auscultation admits candidly that even this number of 140 double, or tic-tac, sounds is often not present in pregnancy, and, on the other hand, that it is sometimes present when there is no fœtus in utero.

"6. That the fœtal heart is so surrounded by a large mass of dense maternal structures and bloodvessels, and by the solid limbs and organs of the child, that it seems next to incredible that any sound emitted by it could ever reach the ear of an auscultator.

"7. That the whole system of fœtal auscultation originated soon after the dawn of general auscultation, when men's minds were excited by the love of novelty, and warped by many erroneous impressions and mistaken modes of thinking, and has since been mainly upheld by authority."

MEDICAL JURISPRUDENCE AND TOXICOLOGY.

42. *On the Closure of the Anterior Fontanelle.*—M. Roger observes that some of the commonest facts are those which are known with the least exactitude, and instances the contradictory statements made by the most eminent anatomists as to the period when the fontanelles close. He has himself examined 300 children expressly to settle the point, and in this paper states the results. It is to be observed that he indicates the clinical and not the anatomical closure, the former being considered to be present when the space is completely filled up with matter as resisting as bone, and neither depression or cephalic *souffle* is perceptible. Actual bony union can only be proved by post-mortem examination. He gives the results of his examination of the 300 heads in detail, the general conclusion being that the period of closure is comprised between the age of *fifteen months*, when its occurrence is very rare, and the age of *three and a half years*, by which time it has always taken place. The usual period is between the *second and third year*. The frequency of the occlusion regularly progressive from the twentieth to the twenty-third month, underwent a sudden increase after the second year, and went on increasing more and more to the third and a half year. Two affections may retard occlusion, rickets, and hydrocephalus; and its non-occurrence may be one of the first manifestations, and afterwards a means of diagnosis, of the former of these affections; while the persistence, extent, and especially the increase of the apertures at an age when they should have closed, are certain signs of hydrocephalus. Their premature occlusion, on the other hand, may give rise to a fear of the induction of compression of the brain, and a, so to say, stifling of the intellect, *i. e.* a microcephalon or idiotcy. The rigorous determination of the period of the disappearance of the fontanelles may be of utility in legal medicine, in approximately establishing the age of a child or in a question of its identity.—*Med. Times and Gaz.*, April 21, 1860, from *Union Méd.*, 1859, No. 140.

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43. *On the Linæ Albicantes in Puerperal Women.*—Dr. Credé was induced to prepare this paper by what he considers too indiscriminate a statement made by Casper, in his *Handbook of Juridical Medicine*. Casper states that the white lines or streaks of the abdomen are always present in women who have borne children, while women who do not exhibit them may be pronounced not to have had children. He states that he has never been deceived in his diagnosis of delivery by their aid. This statement, from so high an authority, made in a book of large circulation, calls for, in Dr. Credé's estimation, a critical examination, and he lays down, as the result of his own observations, the following propositions:—

1. These lines are formed in very different degrees in the majority of pregnant women, but are very seldom observed during the first half of pregnancy, and often only during the last or the penultimate month. During his management of the obstetrical department of the Berlin Charité, and at the Leipzig Obstetrical School, Dr. Credé has paid particular attention to the matter, and the general result is that these white cicatrix-like lines have been observed in 90 per cent. of the cases examined; and they have very rarely ever been met with during the first half of pregnancy. They are usually disposed with some regularity, radiating from a mesial point that is placed about one or two inches below the umbilicus. With the expansion of the abdomen, the lines often become more irregular and unequal on the two sides.

2. After delivery they put on another appearance, but do not entirely disappear. The freshly-produced streaks, especially in primiparæ, are of a shining, bright, reddish appearance, in women having fair or red hair, and brownish in those whose hair is darker. The redness is lost sometimes only a few days after delivery, leaving a dirty white appearance, accompanied by wrinkling of the skin. On the occurrence of a new pregnancy, however, or when the abdomen becomes distended from any cause, the streaks exhibit a shining whiteness, with here and there a brownish tinge.

3. In several instances no traces of these appearances are discernible, even after repeated pregnancies. The result of Dr. Credé's most careful examination went to show that these lines were absent in 10 per cent. of the cases he examined expressly to ascertain the fact; of these cases, 7½ per cent. were primiparæ, and 2½ per cent. multiparæ.

4. These streaks are sometimes formed only during the second or third pregnancy, or new ones may become added to those already existing. This may be owing to the greater distension the abdomen has undergone in subsequent pregnancies. In general, it will be found that the woman in her first pregnancy was not strong, and had not carried her child to its full time. It is, at all events, common for a woman who has gone through a normal pregnancy without these lines appearing, to have them manifest themselves on subsequent occasions; on the other hand, it is not uncommon for those who have aborted at the fifth or sixth month, to first exhibit them at the end of a subsequent pregnancy. That these marks, when once formed, ever disappear, Dr. Credé does not admit, and consequently he denies the correctness of the statement that they are met with more abundantly in primiparæ than in multiparæ. They are only more plainly seen on account of their brighter colour.

5. The lines may also appear as a consequence of various diseases which give rise to great and sudden distension of the walls of the abdomen; and this not only in aged women, but also in young persons who may very well become the subjects of juridical investigation.

6. Lines of exactly a similar appearance which occur on the breasts, thighs, buttocks, or calves of the leg, equally deserve consideration with those observed upon the walls of the abdomen. Montgomery has especially dwelt upon the importance of the sign derived from the coincidence of the lines on the breasts and abdomen. Dr. Credé's observations have convinced him that their presence is of much seldomer occurrence on the breast and other parts named than on the abdomen.—*Med. Times and Gaz.*, June 9, 1860, from *Monatsschrift für Geburtskunde*, Bd. xiv.

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44. *Condition of the Lungs after Death from Chloroform.*—In an essay published in the *Archives Générales* (1858), M. FAURE endeavoured to prove that when chloroform, in place of spreading equally and uniformly over the lungs, became concentrated at certain points during inhalation, such important modifications of the pulmonary tissue resulted as seriously to compromise the functions of respiration. The lungs then presented violaceous, or blackish spots which, on excision, proved to be deep-seated ecchymoses, having a greater extension within than externally. The tissue had lost all crepitation, becoming as if "felted," the blood no longer leaving it, but seeming to have become combined with it. It has been objected that such lesions were the result of the

mode in which the experiments were carried on, and that man, not breathing through tubes passed into the trachea, need not exhibit such appearances.

A recent case, however, contradicts this view. A woman who had inhaled chloroform died suddenly, when to all appearances she was about to be saved; and the condition of her lungs was exhibited before the Paris Society of Surgery. The lungs, several portions of which were in a normal condition, exhibited some singular congestions and ecchymoses, resembling those which M. Faure has described at great length, and having this remarkable, that they did not disappear even after the lung had been macerated for eight hours in water—the blood seeming, so to say, to have become combined with the pulmonary substance. The right lung was attached to the thorax by firm old adhesions, but the left lung was entirely free from these. The latter crepitated over nearly its entire extent, the non-crepitant portion being proportionally very small in extent, and emphysematous. The right lung crepitated nowhere, but was a very dense, fleshy, resisting mass, containing only a small quantity of air at its edges. Its colour was deep red or blackish at certain points; this not resulting from hypostasis, for it was less deep where in that case it would have been most observed. The left lung was much less deeply coloured at points, but its general appearance was of a bright red. But the upper lobe of the left lung, *i. e.* just the point least liable to cadaveric congestion, exhibited a considerable dense, deep-red congested portion, exactly like, indeed, the totality of the right lung. The heart was manifestly hypertrophied.

Thus, in this case, the left lung had been in its normal condition, but the right lung was deprived of a portion of its functions—a circumstance which would become a source of danger when the subject was submitted to the action of chloroform. It is certain that when a lung can no longer move freely in the pleura, its movements are diminished, and its circulation is more or less impeded. Chloroform, in place of becoming distributed equably and uniformly, may then become accumulated in considerable quantity in a lung which can no longer return upon itself in consequence of the adhesions which affix it to the parietes of the thorax; and lesions are produced resembling those which M. Faure determined artificially in animals—lesions which render the lung unsuited for hæmatosis and the continuance of life impossible.—*Union Méd.*, 1859, No. 144.

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45. *Detection of Arsenic, Antimony, Copper, and Bismuth, by Electrolysis.*—Prof. Bloxam, of King's College, has given the results of a very successful investigation of this subject, and showed that, by proper refinement in the method of operating, the process of electrolysis may become a certain and delicate means of detecting one or all of the metallic poisons, at least, with but few exceptions. In an examination for arsenic by this method, the metal is obtained in the form of arseniuretted hydrogen; the process is therefore very similar to that of Marsh, over which, indeed, it does not present any advantage in point of delicacy. Marsh's process, however, although it is capable of doing all that can be done by electrolysis with even greater delicacy, is open to several well-known objections, which have stood in the way of its practical adoption by toxicologists. The process of electrolysis does not involve the use of zinc, which is so difficult to obtain pure. It forms a general method for the detection of several metallic poisons at once, and the material tested is not destroyed or inconveniently contaminated, but may be used for another operation. When the arsenic, on the other hand, is present in a state of arsenic acid, it cannot, according to Prof. Bloxam's experiments, be detected with certainty by electrolysis. It is consequently necessary to reduce the arsenic acid by means of sulphurous acid. This is an objection which does not apply to Marsh's process. In his earlier experiments, Mr. Bloxam made use of a U tube containing dilute sulphuric acid; the substance to be tested was introduced into one of the limbs, and a cork with a bent tube fitted to its mouth; two platinum plates, leading from the poles of a battery containing five cells of Groves, were introduced into the two limbs, and the liberated hydrogen passed through the bent tube, which was heated by a lamp, when the arsenic, if present, was deposited.

The form of apparatus ultimately adopted as being the most convenient, con-

sists of a two or three ounce bottle, the bottom of which has been cut off, and replaced by a piece of vegetable parchment, bound on with platinum wire. To the mouth of the bottle is fitted a cork with a bent tube and a piece of platinum wire, which passes through the cork, and turns up beneath in the form of a hook. A slip of platinum then hooks in the end of the wire, and passes nearly to the bottom of the bottle; it forms the negative pole of the arrangement. The bottle stands in an ordinary test-glass, and the positive pole, also of platinum, stands in the glass. Dilute sulphuric acid is put into the bottle, and also the glass, so as to stand to the same height in both vessels. The substance to be tested is introduced into the bottle, the cork adjusted, and the wires connected by five cells of Groves' battery; the heat of a spirit lamp is applied to the bent tube, and in the course of a quarter of an hour a distinct mirror is obtained, if arsenic is present. Standard solutions, containing respectively a tenth, a hundredth, and a thousandth of a grain of arsenious acid, were prepared and examined by this process, and in every case a successful result was obtained. These solutions were then mixed with organic substances, such as the ordinary articles of food—meat, eggs, milk, &c.—and the resulting matter examined.

It was got into solution by means of chlorate of potash and hydrochloric acid, and the resulting fluid evaporated down by means of a water-bath to a thick, syrupy liquid. The arsenic was thus obtained in the state of arsenic acid, which does not give a certain result by the electrolytic process. Some sulphurous acid was therefore added, and the mixture introduced into the bottle, after expelling the excess of sulphurous acid by evaporation; a drachm of alcohol was then poured over the surface, and the process put into operation. The author prefers to add this drachm of alcohol in every case, inasmuch as it not only allays the frothing, but also affords an additional indication of the presence of arsenic; for when these two substances are present—the alcohol and the arsenic—the gas which escapes at the open end of the test tube possesses a very peculiar odour, resembling alkarsin. If a little sulphurous acid be present, it also furnishes an additional character indicative of arsenic; namely, a slight yellow deposit, consisting of sulphide of arsenic, close to the borders of the metallic mirror. In all these experiments, of which a great number were made, the thousandth of a grain of arsenious acid was readily detected.

The other metals which may be detected by this process are mercury, antimony, copper, and bismuth; lead is precluded by the sulphuric acid which is present. These are all precipitated in the metallic form upon the slip of platinum, and even in the case of antimony a mere trace of antimoniuretted hydrogen is formed, the metal being all deposited upon the negative pole. The mode of proceeding in these cases is precisely similar to that adopted for arsenic; when the operation is concluded the slip of platinum is detached, washed, and the deposit dissolved off in the usual manner. Thus, where an organic mixture has to be examined for arsenic, mercury, copper, antimony, and bismuth, it is prepared in the manner just described for arsenic, and the resulting liquid introduced into the bottle, the drachm of alcohol poured over the surface of the contents, the cork adjusted, and the battery connected. The heat of a spirit lamp is applied to the bent tube, and the operation continued for about a quarter of an hour or twenty minutes, when, if arsenic is present, a metallic deposit, accompanied by some crystals of arsenious acid, will be formed in the tube, and the escaping gas will have the alkarsin-like odour. The piece of platinum in the bottle is next removed, washed, and boiled in yellow sulphide of ammonium. Antimony would be dissolved and might be obtained as sulphide by evaporating this solution to dryness. The other metals would still remain in the plate; it is next boiled in nitric acid containing a trace of hydrochloric acid, the solution evaporated to a small bulk, and an excess of ammonia added. Oxide of bismuth would be precipitated, together with whatever traces of platinum had been dissolved. The precipitate may be dissolved in hydrochloric acid, and tested by pouring into water, &c. The ammoniacal filtrate would contain the copper, indicated by its blue colour, and the mercury. By boiling with hydrochloric acid and a slip of copper, the latter would be separated in the metallic form.—*Pharmaceutical Journal*, January, 1860.